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# DEPARTMENT OF AGRICULTURE

# BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE NEWS LETTER

VOLUME V 9

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR FEBRUARY 1938

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## FRUIT INSECT INVESTIGATIONS

Hibernation of plum curculio.--As very few adults of the plum curculio have ever been found in hibernation and as there has been considerable speculation as to exactly where this insect hibernates, studies have been made by Oliver I. Snapp and J. R. Thomson, Jr., at the Fort Valley, Ga., laboratory, to determine just where it passes the winter and its condition during the hibernating season. The plum curculio was found hibernating in debris, woods mold, and other materials, at the edge of woods bordering or near peach orchards. The individuals reared and fed in the field had built up a large reserve of body fat before entering hibernation and apparently have more of this fat than do the individuals reared and fed in the insectary. It was found that hibernating female plum curculios do not contain eggs that have developed to any extent. These workers had heretofore determined that a period of about 1 month is required for eggs to develop and mature in the bodies of female plum curculios and, as there is no egg development in hibernating individuals, an explanation is presented as to why plum curculio adults do not begin to deposit eggs in peaches for a period of a month or more after they appear from hibernation. This gives peach growers an opportunity to apply a spray for the control of the plum curculio before the beginning of the oviposition season in the spring.

Volatility a factor in effectiveness of oil emulsions in control of San Jose scale.--Oliver I. Snapp and J. R. Thomson, Jr., have just completed the third season's experiments to determine the relation of volatility of lubricating oils to their effectiveness in the control of the San Jose scale on peach trees at the Fort Valley laboratory. A series of seven oils, with volatilities ranging from 0.3 to 6.9 percent and with practically the same viscosity, were used at two strengths for this year's experiments. The data obtained during the 3 years' work indicate that for best results in the control of the San Jose scale, the volatility of a mineral oil should be not more than 1 percent, although the toxicity of the insecticide to that insect is not greatly affected when oils having a volatility between 1 and 4 percent are used, provided, of course, that the viscosity is within the range of 125 seconds Saybolt or higher. Control of San Jose scale was greatly reduced this year with oils having a volatility range between 4.9 and 6.9 percent, the viscosity being within the recommended range.

Growers using fewer treated bands for codling moth than formerly.--Surveys made by M. A. Yothers and E. J. Newcomer in the vicinity of Yakima and Wenatchee, Wash., for the last 5 years have shown that the following percentages of orchards have been banded with chemically treated bands:

| Year | Yakima | Wenatchee |
|---|---|---|
| 1933 | 33 | 33 |
| 1934 | 38 | 35 |
| 1935 | 30 | 34 |
| 1936 | -- | 23 |
| 1937 | 17 | 12 |

## MEXICAN FRUITFLY CONTROL

More Mexican fruitfly found than in February 1937.--Fruit continues to move at a rapid rate to the packing and processing plants. It is estimated that 75 percent of the crop has been harvested and that much of the remaining crop will be picked before the end of March. Trap catches throughout February indicated that the population of *Anastrepha ludens* Loew was slightly lower than in January and approximately one-twentieth as high as in February 1937. Much closer field inspection, however, revealed 16 larval infestations. This year's total exceeds that of February a year ago by three. The numbers and species of fruitflies identified in February are shown in the following table.

| Species | Texas | Mexico |
|---|---|---|
| Adults | Number | Number |
| *Anastrepha ludens* | 71 | 6 |
| *A. serpentina* Wied | 22 | 2 |
| *A.* sp. "L" | 1 | 0 |
| *A.* sp. "Y" | 9 | 2 |
| *A.* sp. "n. sp." | 2 | 0 |
| *A. pallens* Coq | 863 | 25 |
| Miscellaneous | 25 | 0 |
| Total | 993 | 35 |
| Larvae |  | 1/ |
| *A. ludens* | 320 | 561 |
| Grand total | 1,313 | 596 |

1/Market fruit.

## CEREAL AND FORAGE INSECT INVESTIGATIONS

Airplane meets wind-borne grasshoppers at high elevations.--The following notes were contained in a letter from John P. Gaty, vice president of the Beech Aircraft Corporation, under date of February 16: "On February 12, 1938, while flying from Des Moines, Iowa, to Kansas City, Mo., at an altitude of 2,000 feet, considerable numbers of grasshoppers were encountered. Many of them were killed by smashing into the structure of the airplane. Winds of gale velocity had been blowing from the southwest for more than $2\frac{1}{2}$ days. Undoubtedly these insects had been carried by this strong southwest wind into the area in which we found them. We have often encountered grasshoppers in flight at altitudes above 10,000 feet."

Differences between single- and multiple-strains of European corn borer.--K. D. Arbuthnot, New Haven, Conn., reports that the multiple-generation strain from the field near New Haven, and the single-generation strain from the field near Toledo, Ohio, will cross and produce fertile eggs. The multiple-generation strain, in the two generations reared in the laboratory, showed a consistence in its reactions which indicate that this is a homozygous strain. The single-generation strain, in the two laboratory generations, showed inconsistencies which indicate that this material is not homozygous but is a mixed race. The reciprocal crosses between the two strains were very vigorous in the $F_1$ generation, as evidenced by high rate of larval survival and egg production, but the $F_2$ larvae had a very low rate of survival. Because of the inconstancy of characters in the parent single-generation race, no analysis can be made of characters or their behavior in the crosses.

Field tests with insecticides for European corn borer control. C. H. Batchelder, New Haven, says that under the seasonal conditions of corn borer populations and climatic factors prevailing in the New Haven area in 1937, reductions of corn borer populations in ears of early market sweet corn when treated with insecticidal agents under commercial conditions averaged 78 percent with the quebracho-fixed nicotine treatment and 77 percent with the derris treatment, both applied as sprays. Dual-fixed nicotine, applied as a dust, reduced the corn borer ear populations 71 percent under similar conditions. These reductions were accomplished at average total costs per acre as follows: Quebracho-fixed nicotine, \$25.06; derris, \$24.84; dual-fixed nicotine, \$22.38. Dual-fixed nicotine and cube applied as dusts and quebracho-fixed nicotine applied as a spray effected approximately 90 percent reduction of borer populations infesting dahlias in experimental plots. Second-generation corn borers severely infesting ears of late-grown sweet corn were reduced from 80 to 90 percent as a result of treatments with dual-fixed nicotine dust.

Varietal resistance of field corn to European corn borer.--L. H. Patch and R. T. Everly, Toledo, Ohio, report that double crosses involving $R^4$, Hy, and L317B2 in their pedigree, if the additional inbred is not a susceptible line, are about as borer-resistant as the standard single cross $R^4$ X Hy. It is indicated that the single cross $R^4$ X L317B2 is the most borer-resistant of the field-corn strains tested to date, only half as many borers surviving on this strain as on $R^4$ X Hy from an equal number of eggs in the 1937 tests. Of 146 inbred field-corn strains tested to date, only the following 4 may be classed as materially borer-resistant: Illinois $R^4$, Iowa L317B2, Iowa 205, and Michigan 77. The largest part of the differentiation in the number of borers between $R^4$ X Hy and A X Tr takes place in the first 6 days, and is possibly associated with leaf characters as indicated by differences in feeding habits of the borer on the leaves of the two strains. The corn-borer resistance of $R^4$ X Hy is shown to be operative at least over a 30-day developmental period, ranging from 21 days before pollen shedding to 4 days after. Michigan Hybrid No. 561, reported by Marston to be resistant to the corn borer, was found not to be resistant in comparison with standard strains of about equal seasonal requirements under the conditions of tests conducted at Toledo. This interpretation applies to resistance as measured by larval survivals, egg deposition, and tolerance, the last as measured by reduction in the yield of grain by a given number of borers.

## JAPANESE BEETLE CONTROL

Further reduction in W. P. A. force.--At the completion of the February work period, the Works Progress Administration personnel was reduced to 1,182 men. The Connecticut State W. P. A. office requested that it be given in advance a list of names of men whose services were to be terminated at the end of the work period. Upon receipt of this list the office made reassignments to local projects. Notices of transfer were given to the men at the same time they were notified that their services were being terminated on the Dutch elm disease project.

Seasonal sanitation activities nearing completion in New Jersey.--Regular activities in dead and dying elm sanitation were rapidly nearing completion in some sections of New Jersey at the end of the month. All scouting for dead and dying trees was completed in Bergen, Mercer, Morris, and Union Counties. Scout crews in Bergen and Morris Counties were transferred to regular sanitation work. In Mercer County less than 2,000 tagged decadent trees remain standing, and in Union County less than 1,000. The only remaining dormant season scouting in the State is in Middlesex County, where the work is necessarily slow because the scouts are spotting on scouting maps all standing elms, as well as elm-free areas.

Sanitation work completed at Indianapolis.--Sanitation work has been completed in the Crown Hill section of Indianapolis. Several hundred trees were pruned and over 100 devitalized elms removed from the 300-acre plot.

Social Security numbers for W. P. A. workers.--The State leader in charge of the Dutch Elm Disease field headquarters at Norwalk, Conn., was requested by State W. P. A. officials to obtain and submit to them the Social Security numbers of W. P. A. personnel employed by the division. It was found that less than 25 percent of the men had applied for Social Security numbers.

Sanitation activities disclose concentration of disease.--Eleven diseased trees were reported in mid-February in a small area within the Great Swamp in Morris County, N. J. Confirmations were obtained from specimens submitted by regular clear-cutting crews.

Special sanitation work completed on private estate.--Selective sanitation work was completed by February 26 on an estate in North Castle Township, Westchester County, N. Y. Special attention was given this location because 13 confirmed trees had been found on the property during the 1937 scouting season.

Inspection of wood shavings.--Tests are in progress to determine whether a special machine, recently built to convert wood edgings into shavings, will separate out or destroy any gypsy moth eggs that may be deposited on the edgings. The owners of a box factory and dressing mill in the heavily infested area of southern New Hampshire recently applied for inspection and certification of 125 carloads of wood shavings to be manufactured from waste-wood edgings. Approximately 65,000 feet of round-edge lumber are sawed daily at this factory, and waste-wood edgings accumulate at the rate of about 30 cords a day. Actual inspection of this large quantity of waste material is impracticable, therefore disinfection or heat treatment are the only methods of obtaining certification. These methods are too costly for the manufacturer.

Infestations in inspected commodities.--One or more egg clusters were found in seven shipments presented for inspection and certification in February. The largest infestation, consisting of nine egg masses, was removed from seven truckloads of logs inspected at Ossipee, N. H., for movement to Saint Johnsbury, Vt. Six egg clusters were taken from a carload of white birch wood destined from Dixfield to Lincoln, Maine. Smaller finds were made in hemlock boughs and lumber, making a total of 24 egg clusters intercepted during the month.

Heavy gypsy moth infestation near granite-cutting sheds.--A report from the district inspector at Quincy, Mass., indicates that there is a heavy gypsy moth infestation throughout the areas where the granite-cutting sheds are located in this center for building and monumental granite. City employees of the local moth department creosoted the egg clusters in these localities.

Heavy shipments of certified pulpwood.--During February, 1 company shipped 75 carloads of pulpwood to paper mills in northern New York. This product was obtained in the spruce-growing sections of New Hampshire and Vermont. It was certified on the basis of either inspection of the lot where grown or actual inspection of each log, depending on the conditions of infestation in the cutting areas.

Dahlia growers appoint corn borer committee.--Concern among dahlia growers over the rapid increase and spread of the corn borer is indicated by the appointment of a corn borer committee by the American Dahlia Society. One of the duties of this committee is to urge research activities particularly directed to control of the borer in dahlias. The past moderate winter is believed to have been favorable for corn borer survival in New Jersey and on Long Island, where dahlia growing is seriously affected by this pest.

Movement of nursery stock begins in Japanese beetle area.--Early season shipments of nursery stock from classified nurseries began in volume in February. Spring orders to the South were dispatched from the Philadelphia area. Three carloads of stock, consisting of fruit trees and rose seedlings, were certified from the Eastern Shore of Maryland. An unusual shipment for this time of the year, 100,000 tomato plants, was certified for shipment from New Jersey to a grower in North Carolina.

*Adult beetles in greenhouses.*--Adult beetles emerged as usual in the "run-hot" rose-growing greenhouses in the Philadelphia area. Several greenhousemen have employees picking them daily. Little damage to rose blooms has been reported, as many of the growers also had employees destroy all adults seen last summer. A report was also received of adults being found in a greenhouse in the New York area. Two beetles were found on February 18 in an infested greenhouse on Staten Island.

*Winter larval collection.*--Five hundred Japanese beetle larvae were collected during the month in the vicinity of Shiloh, N. J., in a section where the ground had thawed sufficiently. These were found a spade-length deep and deeper. The larvae will be used in trials with methyl bromide as a fumigant for strawberry plants now being conducted at Salisbury, Md.

## FOREST INSECT INVESTIGATIONS

*Bark beetles more destructive than fire in Rocky Mountain region.*--According to J. A. Beal, of the Fort Collins, Colo., laboratory, insect losses in the forests of the central Rocky Mountain region have been particularly severe during the last few years. Bark-beetle outbreaks in the pine type are responsible for most of these losses and the Black Hills beetle (*Dendroctonus ponderosae* Hopk.) ranks first from the standpoint of destructiveness. Its importance as a tree killer can be illustrated by comparing the volume of timber it has killed annually in recent years with the volume lost annually by fire and with the annual timber cut. These data are presented by States in the following table:

| State | Annual losses from-- Fire, all tree species | Annual losses from-- D. ponderosae, pine only | Annual timber cut, pine only |
|---|---|---|---|
| | Board feet | Board feet | Board feet |
| Colorado--- | 380,000 | 15,000,000 | 51,907,000 |
| Wyoming---- | 11,723,000 | 69,150,000 | 35,706,000 |
| Utah------- | 1,163,200 | 7,500,000 | 5,730,000 |
| Total---- | 13,266,200 | 91,650,000 | 93,343,000 |

There are some very apparent reasons for this present condition: First, fires are held in check by an adequate fire-detection and fire-suppression system, whereas insect losses have received far less attention; second, we are undergoing a period of extremely heavy insect losses which have probably been augmented by weather conditions favoring the development of bark-beetle outbreaks; third, from the standpoint of timber cut, this is not a particularly heavy lumber-producing region, as much of the timber has a higher value for other purposes.

*The Douglas fir beetle causes a tax problem in Oregon.*--In 1935 the Douglas fir beetle (*Dendroctonus pseudotsugae* Hopk.) attacked a great many Douglas firs in the vicinity of the Tillamook Burn in Oregon. This occurrence did not come to the attention of timber owners in the affected area until 1937, when a 20-percent cruise of one large property showed that

82,130,000 board feet had been killed on 15,000 acres. R. L. Furniss, of the Portland laboratory, states that the problem now confronting this company is to determine when the trees died. Fading of attacked Douglas fir trees is comparatively slow and, in addition, many trees suffer a delayed death as a result of infection by Ceratostomella, a blue-stain fungus introduced by the beetles. Therefore it may not be possible to cruise the entire loss until the second year after attack. The importance of this problem lies in the fact that the company in question is salvaging burned timber and can claim credit for a reduction in taxes on the basis of the beetle-killed volume. As the reduction is dependent on the amount of timber salvaged in the year of the loss it is necessary to determine when the trees died, in the eyes of the law.

Insect problems worry forest supervisors.--At the recent annual meeting of the Regional Investigative Committee, two forest supervisors, one from the Douglas fir region and one from the ponderosa pine region, were asked to enumerate the most important problems requiring solution in their respective territories. Of the half dozen or so subjects mentioned by each supervisor, forest insects were given an important place.

Pine trees recovering from injury by unseasonal temperatures.--During the latter part of October and the first part of November 1935, a 3-day period of low temperatures occurred throughout most of the northern Rocky Mountain region. These low temperatures, although not extreme for the region, were abnormal for the season and were preceded by a period of unusually warm weather. This sudden climatic change killed considerable western white pine and ponderosa pine foliage in many parts of the region, and records have been taken to determine the rate of recovery and susceptibility to bark-beetle attack. W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory, reports that in the second year following injury two of the mature white pine trees marked for observation were attacked and killed by the mountain pine beetle. This loss is no greater, however, than that which occurs under normal conditions. In the white pine reproduction plots two trees have died with no evidence of insect injury, indicating that the climatic injury was perhaps responsible. In general, all living trees are making good recovery. In white pine reproduction recovery appears to be in direct proportion to the severity of injury. In mature ponderosa and white pine, the slower growing trees suffered most injury but are apparently making the most rapid recovery.

Spray controls mountain pine beetle in lodgepole pine.--In 1936 and 1937 a series of experiments to develop a spray that would control the mountain pine beetle in lodgepole pine was carried on by A. L. Gibson and J. C. Evenden, of the Coeur d'Alene laboratory. Certain lethal oils applied late in the spring and early in the summer were found to readily penetrate the thin bark of lodgepole and gave nearly 100 percent control of all stages of the insect. This method offers many advantages over present control methods, chief of which are: (1) The small amount of equipment required; (2) freedom from fire hazard, a very objectionable feature of previous methods; (3) control operations can be deferred until road and weather conditions are favorable for establishing control camps; and (4) control can be conducted until immediately prior to emergence of the insects late in July.

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*Elm bark beetle penetrates bark on sprayed trees.*--During the winter of 1934-35, R. R. Whitten, of the Morristown, N. J., laboratory, conducted a few experiments to test the effectiveness of certain insecticidal sprays in preventing feeding by adults of the smaller European elm bark beetle (*Scolytus multistriatus* Marsh.) in the twig crotches and elsewhere on the bark of elm. Observations and experiments have shown that elm trees commonly become infected with the Dutch elm disease fungus after adults of *S. multistriatus*, contaminated with fungus, have fed on them. Mr. Whitten's experiments were conducted in a greenhouse and consisted of spraying both small potted elms and small elm twigs with an insecticide and exposing the sprayed material, together with untreated elms and twigs, to attack by a known number of adults. The measure of control was determined by counting the feeding scars which penetrated the cambium and by the dry weight of the beetle excrement after all beetles had died in the cages containing sprayed elms and twigs. Lead arsenate, magnesium arsenate, zinc arsenate, ferric arsenate, and cupric arsenate were used at the rate of 10 pounds to 100 gallons of water. The dry weight of the beetle excrement showed that all the spray mixtures reduced the amount of feeding per beetle, but feeding scars which extended well into the xylem were found in all cases. Further experiments were conducted by R. R. Whitten and W. C. Baker during the past winter. Two 5-year-old potted elm trees were thoroughly sprayed with each mixture used. The sprayed trees and two untreated trees were placed in a large indoor screened cage. Twenty-five hundred active *S. multistriatus* adults were liberated in the cage and allowed to feed for at least 2 weeks. The trees were then removed and the feeding scars in the twig crotches and on the trunks counted. The entire procedure was later repeated. The two lots of trees are referred to as "Series A" and "Series B" in the following table, in which the numbers of feeding scars on trees receiving different treatments are shown.

| Spray formula | Feeding scars in-- | | | | | |
|---|---|---|---|---|---|---|
| | Series A | | Series B | | Total | |
| | Crotches | Trunk | Crotches | Trunk | Crotches | Trunk |
| | Number | Number | Number | Number | Number | Number |
| Lead arsenate, 5 lbs., linseed oil, 20 oz., water, 100 gal------ | 57 | 57 | 70 | 9 | 127 | 66 |
| Concentrated lime-sulphur, 1 part, water, 50 parts----- | 25 | 6 | 43 | 28 | 68 | 34 |
| Quebracho-fixed nicotine, 1 part, water, 100 parts---- | 20 | 2 | 64 | 15 | 84 | 17 |
| Untreated------------ | 93 | 74 | 45 | 39 | 138 | 113 |

The table shows that none of the spray mixtures prevented feeding by the beetles. Most of the beetles found in the feeding scars when the trees were finally examined were alive, except on the trees sprayed with lead arsenate. On these trees over 90 percent of the beetles were dead but death did not occur until the beetles had reached the xylem.

## GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Infestation found near Connecticut-New York State line.--A crew of agents assigned to special scouting in Kent, Litchfield County, Conn., on February 1 found several gypsy moth egg clusters outside of the area sprayed last season.

New infestation in Pennsylvania quarantined area.--A gypsy moth infestation consisting of two egg clusters was recently discovered in the southern part of Penn Forest Township in Carbon County, Pa. This isolated infestation, which is near the southern border of the quarantined area, is only a few miles distant from the site of a colony that was exterminated in Mauch Chunk Township several years ago. Eradication of the new infestation this season is expected.

Infested areas cleared in preparation for spraying.--Most of the unskilled laborers assigned to gypsy moth work in the Pennsylvania area are now engaged in piling and burning dead wood and debris in areas where infestation is known to occur. It is fortunate that the absence of snow permits an early start on this type of work, as much remains to be done before the eggs hatch. Work of this nature cannot be done satisfactorily when the ground is covered with snow.

Loose bark in burned-over area retards gypsy moth work.--Gypsy moth crews working in the northern part of Kidder Township, which is in the southern part of the Pennsylvania quarantined area, are laboring under most trying conditions. A serious forest fire swept through the section where work is in progress in the summer of 1934, killing practically all of the trees. An enormous number of trunks and large branches are now covered with loose bark, which must be removed and examined by the scouts. The work is further complicated by the development of sprouts at the bases of the dead trees. Dead leaves and twigs, which lodge between the sprouts and the tree trunks, must be removed in order to determine the presence or absence of gypsy moth infestation.

New quarantine regulations in effect in Pennsylvania.--The new quarantine regulations promulgated by the State of Pennsylvania Department of Agriculture concerning the movement of materials likely to harbor the gypsy moth became effective on February 15. It has already been possible to reduce the number of men employed on inspection and certification work, and a further reduction in personnel will be possible after the shippers become thoroughly familiar with the requirements of the modified regulations.

Shippers and courts cooperate in enforcing Pennsylvania quarantine.--Excellent cooperation has been maintained between the officers charged with enforcing the Pennsylvania State quarantine on account of the gypsy moth and the shippers and property owners within the quarantined area. The courts have also cooperated in the prosecution of willful violators of the quarantine regulations. There were 371 violations of the quarantine regulations, during the calendar year 1937, by persons who were unfamiliar with the requirements. Each of the first offenders was sent a formal warning by the State bureau of plant industry and was officially informed that he would be prosecuted in case of a second violation. Only eight of the group violated the quarantine regulations a second time and each was prosecuted, found guilty, and fined.

Discarded rubbish is a serious problem in Pennsylvania.--A serious problem in connection with the gypsy moth eradication campaign now being waged in Pennsylvania is the inspection of tin cans, old jars, and other worthless articles dumped in wooded areas, especially in the residential sections. The discarding of materials of this nature along river banks is particularly serious, as it greatly increases the possibility of downstream spread of the gypsy moth during flood periods.

Check-up work by Federal and State forces in New Jersey.--The small force of W. P. A. employees assigned to duty in New Jersey has completed scouting work in the area in Mendham Township, Morris County, where a male gypsy moth was recovered at an assembling cage a year ago last summer, and they are now working in the adjoining township of Randolph. The State forces are scouting at the sites of infestations located several years ago, which are apparently exterminated. No evidence of the presence of the gypsy moth has been found by either W. P. A. or State employees.

Over 2½ million egg clusters creosoted by C. C. C.--From July 1, 1937, to February 19, 1938, C. C. C. enrollees have creosoted over 2,685,000 gypsy moth egg clusters. Of these, approximately 2,445,000 were destroyed in Massachusetts, 217,800 in Vermont, and 22,000 in Connecticut.

C. C. C. work program rearranged in southwestern Massachusetts.--Necessary work at severe infestations in some of the towns near the barrier zone, worked by the C. C. C. gypsy moth camp in Westfield, Mass., has retarded progress in that section, and it will not be possible to treat as large an area as was anticipated before the eggs hatch. The program is being rearranged to concentrate treatment work in the most dangerous infestations during the remainder of the season, and efforts are being made to obtain additional men for work in that section.

Proposed C. C. C. gypsy moth work in Vermont.--Plans have been made for considerable gypsy moth work by C. C. C. camps in Vermont during the 11th and 12th enlistment periods, which begin April 1, 1938, and terminate March 31, 1939. Of a possible 35,000 man-days, 28,000 have been allotted for gypsy moth work from the Bellows Falls camp. This camp has also been moved higher on the priority list. One crew of men for gypsy moth work has been promised from the Plymouth camp, with the possibility that a second crew may be made available during the winter months. Although the Waterbury camp is located within the barrier zone, 1,000 man-days have been allotted for gypsy moth work in towns immediately east of the zone. Five hundred man-days were promised from the camp in Brunswick for gypsy moth work at a known infestation in Lancaster, N. H.

## PLANT DISEASE CONTROL

*Slashing and broadcast burning as an upland blister rust control measure.*--An area of several hundred acres of the 1926 burn in Lamb Creek on the Kaniksu Forest of Idaho represented such a costly and uncertain control chance that it was not worked when *Ribes* were eradicated on adjacent areas in 1934. Control of the rust by hand-eradication methods on this area would have been very costly because of the abundance of *Ribes* and the difficult working conditions resulting from a dense tangle of standing and fallen snags, *Ribes*, brush, and white pine reproduction. Also there was a strong probability that another fire might sweep the area and destroy the white pine. To add to these difficulties it was found that blister rust infection on the white pine reproduction was well established on the area and increasing rapidly. As a solution to the problem, the Forest Service decided to fell the standing snags and burn the area under controlled conditions, so as to eliminate both the fire and disease hazards. An area of 740 acres was covered by men from one 100-man E. R. A. camp furnished by this Bureau. In the fall of 1937 the debris was burned and nearly all inflammable material on the area was consumed. The burn is expected to largely eliminate *Ribes* regeneration on the area. Within 2 to 4 years any *Ribes* that may appear can be eradicated and the area can be planted to white pine. This method eliminated a serious pest and fire hazard and brought the forest land to a manageable status.

*Blister rust notes from the Southern Appalachian States.*--Blister rust has been found for the first time on white pine in Highland County, Va., three pines being infected. Canker-elimination work was carried out in Geroge Washington National Forest in Augusta County, Va. Of 3,525 pines examined, 135, or 3.8 percent, were diseased. Of these, 111 were treated and 24 removed. In all, 277 cankers were removed, all but 5 being branch cankers. The weather was so moderate in January and February that 495,022 *Ribes* bushes were destroyed by an average of 255 men working 50,411 hours on 87,161 acres.

*Rust observations in Mexico.*--During February, E. C. Stakman and W. L. Popham observed rust conditions in four of the six important grain-growing areas in Mexico. The first stem rust found was on February 11 near Rio Frio, at an altitude of about 8,000 feet. On February 12 infection was found to be abundant in some fields both east and north of Tehuacan. There was a wide variation in the stage of development of crops in the different fields examined in this area, some being in the rosette stage while others had reached the boot, and a few were heading to soft dough. Very distinct overwintering centers of infection could be found in fields seeded during the period September 10 to October 15. The number of centers located in different fields varied considerably. In some only one or two could be found, but in others it appeared that practically every grain plant had become heavily infected with stem rust in the fall and that rust had survived on from 50 to 75 percent of the plants. In some spots the fungus had reached the telial stage. Although the prevalence of stem rust in a few of the more advanced fields between Tehuacan and Orizaba, near Morelia, in the Saltillo area, and near Sabina Hidalgo approached 100 percent, with severity ranging from 5 to 30 percent, the infection was practically all on the lower parts of the stems and on the lower leaves. Hardly a pustule could be found on the flag leaves or necks of plants examined, probably owing to cool dry weather that prevailed for several weeks just prior to the time when observations were made. Mexican officials stated that there was much less rust in Mexico this year than at the same time a year ago. Some of the heaviest infection observed was in two fields of durum wheat about 3 miles east of Tehuacan. It is apparent that the extent to which stem rust will spread in winter wheat in Mexico this year depends on weather conditions between now and harvest time. The aggregate amount of rust in Mexico was not great at the time observations were made, as fields seeded prior to October 15 appeared to constitute only a small percentage of the entire winter wheat crop. Stripe rust was observed to be a little more widely distributed than stem rust; particularly at the higher altitudes.

## COTTON INSECT INVESTIGATIONS

Cotton flea hopper emergence.--K. P. Ewing and R. L. McGarr, of Port Lavaca, Tex., report that the first cotton flea hopper nymphs hatching from overwintering eggs were recorded in the hibernation cages on February 12. The earliest dates previously recorded at Port Lavaca were February 8 in 1934 and February 12, 1937. In February of this year 554 flea hoppers hatched, the largest number recorded during this month for the 6 years during which records have been made. The maximum and minimum temperatures were higher, and the mean temperature for the month averaged 61.82° F., or 2.5° higher than last year. The rainfall was about the same for the 2 years. On the same date that nymphs were found in the cages, three first-instar and one second-instar nymphs were found in Croton texensis in the field in the light sandy soil area of Calhoun County. This is the first time that positive evidence has been obtained that flea hopper eggs hatched in the open fields before hatching occurred in the cages. During the week ended March 5, two nymphs matured to adults in the insectary and 11 adults were collected on C. texensis in the vicinity of Rockport. This is the earliest date that we have ever found flea hopper adults in eastern Texas.

Rain reduces thrips damage to cotton.--Last May E. W. Dunnam and J. C. Clark examined the various plants used as cover crops on cotton farms and the more important weeds occurring at Stoneville, Miss., to determine the thrips populations and the importance of these plants for early season thrips development. Most of the cover crops and all of the weeds were infested with thrips, but the vetches were by far the most important host plants. The early population appeared sufficient to cause serious damage to cotton. On June 1, after the cotton became large enough to become a favorable host, samples of 20 plants from each of 44 varieties of cotton were examined to determine the thrips population. On June 15 a second examination of the same varieties was made. At the first examination the number of thrips ranged from 7 to 55, averaging 28 thrips per 20-plant sample. At the second examination the range was from 3 to 18, with an average of 10 thrips per sample. This 65-percent reduction in thrips population resulted in practically no terminal bud destruction in any of the 44 varieties. A comparison of the weather records and the thrips population on cotton in 1937 with those in 1936, when a high percentage of terminal buds were destroyed, showed that precipitation was the important factor in the reduction in numbers. In June 1936 rain fell on only 2 days, totaling 0.84 inch, whereas in June 1937, rain fell on 9 days, totaling 4.23 inches. Most of the rain in 1937 also fell during the period between the thrips counts. Of the first 15 days, 7 were rainy, with a total of 4.11 inches and a very heavy rain of 1.74 inches on 1 day. Several species of tyrips were involved, but determinations have not been received.

Hibernating boll weevils in woods trash.--Examinations of woods trash to determine the number of hibernating boll weevils found at various distances from the cotton fields were made by F. F. Bondy at Florence, S. C., in December, January, and February. All of the leafage material and surface litter on the soil surface was collected from 3-foot by 6-foot areas, and stored indoors a few days to dry out and permit the weevils to become active. The material was then passed through a mechanical shaker with screens of different sizes that separates out the large and small trash and reduces the volume to be examined to one-fourth or less of the original volume. Ten samples of surface trash were collected in woods from the edge, at distances of 50 feet, 100 feet, and 150 feet from cotton fields on each of 6 farms, or a total of 240 samples from 2,530 square feet, and were examined with the following results:

| Location | Samples | Weevils | | |
|---|---|---|---|---|
| | | Living | Dead | Average per acre |
| | Number | Number | Number | Number |
| Edge of woods-------- | 60 | 40 | 4 | 1,775 |
| 50 feet from edge--- | 60 | 28 | 1 | 1,176 |
| 100 feet from edge-- | 60 | 8 | 0 | 323 |
| 150 feet from edge-- | 60 | 12 | 0 | 484 |
| Total------------- | 240 | 88 | 5 | -- |
| Average----------- | -- | -- | -- | 940 |

It will be noted that weevils were found in largest numbers at the edge of the woods and approximately 80 percent of the total within 50 feet of the edge. This indicates the probable value of burning the trash along the edges of the woods as a means of reducing the weevils. The proportion of dead and living weevils found is not an accurate index of the mortality that has taken place, because the dead weevils disintegrate and are more difficult to find.

Effects of early disking and irrigation on pink bollworm population.--An experiment was started in December by R. S. Cavitt and O. T. Robertson, of the Presidio, Tex., laboratory, to determine the effect of early winter disking and irrigation on the pink bollworm larvae overwintering in the soil. This is a cultural practice followed by farmers who plant oats, wheat, or other winter crops in the cotton fields. The cotton stalks were cut and burned and on December 18 part of the field was double disked and immediately irrigated. Examinations of the soil and surface trash prior to the disking showed an average of 34.9 pink bollworm larvae per square yard. On February 21, soil samples were again examined and contained an average of 9.6 larvae per square yard, or a reduction of 72.5 percent. In the examinations in the check that had not been disked or irrigated an average of 46 larvae were found in December and 38.3 per square yard in February, a mortality of only

16.7 percent. Although an experiment of this nature is subject to considerable error, it indicates that the early winter disking and irrigation for planting winter crops increased the pink bollworm mortality considerably.

## PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Inspection.--The inspection of green boll samples at the San Antonio, Tex., laboratory has continued to give negative results. In addition to the inspection of green bolls, a considerable number of Thurberia bolls collected in various mountain ranges in southern Arizona have been inspected during the past few months. Gin-trash inspection last fall revealed a rather general pink bollworm infestation in southwestern New Mexico and southern Arizona. The only satisfactory explanation for this spread of infestation is that moths were brought in by favorable wind currents from infested areas to the east. Assuming that this was true, it became important to determine whether Thurberia plants growing wild in various mountain ranges of southern Arizona were infested with the pink bollworm. Some 30,000 Thurberia bolls were inspected and all ranges were found to be infested with Thurberia weevil in varying degrees, the highest infestation being about 33 percent and the lowest about 6 percent. Only one specimen of the pink bollworm was found, this being in bolls collected in the Rincon Mountains east of Tucson. Some additional inspections will be made.

Thurberia-plant eradication.--During the month 920 acres were gone over in the Santa Catalina Mountains and 13,783 Thurberia plants destroyed. The above acreage is somewhat smaller than that covered during previous months. This is due to the fact that the territory covered was exceedingly rough and some time was lost because of unfavorable weather. Towards the close of the month all of the area immediately adjacent to the camp had been completed and plans were being made to move to a new site. This new site is in the national forest, but is under lease to an individual, who has not only granted permission for the camp to be erected in one of her pastures, but has also given the privilege of getting an adequate supply of water from a well adjacent to the new site. Supplies can be trucked right to the camp instead of having to be carried part way by pack train, as has been the case in several previous locations. It is estimated that by hauling the laborers by truck to and from camp each day the present site can be used for the next 3 months, without having to go more than 6 or 8 miles from camp.

Wild cotton.--Very satisfactory progress has been made in the eradication of wild cotton in southern Florida. Work was resumed at Cape Sable the first of the month with six full crews. The area farthest from camp is being worked first, so that in case of bad weather the crews might be able to reach areas nearer camp. A considerable number of seedling plants are being found in the Cape Sable area, but a rather small percentage of them have matured bolls. Considerable difficulty has been encountered in cleaning the keys in Florida Bay, because of shallow water. This area had not been cleaned in about 10 months, and a good many of the plants removed had mature bolls, but very few open bolls. A camp was established on the Chatham River, in the Ten Thousand Islands section, and the crew has been removing a large number of seedling plants. A small virgin colony containing 10 mature plants and 9 seedlings was found by this crew. On the upper west coast, all of the

Bradenton section has been cleaned twice this season. Work has been discontinued for the time being in this section and the men transferred to Cape Sable. In the Fort Myers section all of the area has been covered once and a second cleaning is now in progress. Work on the mainland keys is going forward satisfactorily. This section is now in excellent condition and it is believed that there will be little trouble in maintaining it. During the month some 5,300 acres were covered and 277,116 seedling and 554 sprout plants were removed. By far the larger portion of these plants was in the Cape Sable area. In addition to the above work, some 2,200 acres were scouted without finding any wild cotton.

## TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Cryolite dusts and sprays control corn ear worm on lima beans.--Results of an experiment conducted at Eastville, Va., by L. W. Brannon, of the Norfolk, Va., laboratory, to determine the relative effectiveness of various insecticides for control of Heliothis obsoleta (F.) on Fordhook lima beans show that cryolite dusts and sprays continue to be the most effective materials for control of this pest. Of the three commercial brands of cryolite used in the experiment, imported synthetic cryolite and domestic natural cryolite appeared to be about equal in effectiveness, both brands being slightly more effective than a domestic synthetic cryolite. Talc appeared to be equal in effectiveness to wheat flour as a diluent for cryolite. Of the sprays used, both imported synthetic cryolite and phenothiazine (4 lbs. to 50 gal. of water) gave satiscatory control, the 4 to 50 dilution being more effective than a 3 to 50 dilution in each instance. Nicotine-peat spray gave no control and caused a reduction in the number of pods on the plants at harvest, as compared with the untreated plots. Samples of shelled and unshelled lima beans from the plots that had received four treatments of cryolite dusts and sprays were submitted to the Insecticide Division for analysis to determine the quantities of fluorine residues present. The results of these analyses corroborated similar analyses made in 1936. Most of the samples of unshelled beans exceeded the tolerance established for fluorine on fruits (0.01 grain per pound), whereas most of the residues on the shelled beans were well below this tolerance. These analyses indicate that cryolite may be applied, in the manner indicated in these experiments, without danger of harmful fluorine residues remaining on the edible parts of the beans, provided such beans are shelled before they are consumed.

Experiments against the Mexican bean beetle in Ohio.--Experiments performed in 1937 at South Point, Ohio, against Epilachna varivestis Muls. by N. F. Howard and H. C. Mason, of the Columbus, Ohio, laboratory, gave the following results with the various insecticides tested: Phenothiazine at 2 pounds to 50 gallons of water gave good control, but slight plant injury resulted; derris, cube, timbo, and devil's-shoestrings gave good control at a concentration of 0.015 percent rotenone and usually at concentration of 0.01 percent rotenone. While the use of a varnish sticker with derris and cube increased the degree of control in one instance, no increase could be noted in two other experiments. The use of sulphur with derris or cube sprays, and its use as a diluent with dust mixtures of these materials, does not consistently result in improved control in Ohio; however, its use farther east usually results in better bean crops. Cryolite spray, 3 pounds to 50 gallons, gave satisfactory control in most cases, but the imported synthetic cryolite tested was not as good as a domestic natural cryolite or a domestic synthetic cryolite. Copper cyanide at 3 pounds to 50 gallons gave fair control, but moderate plant injury resulted. Sulphur nitride could not be milled satisfactorily for field use, but with the finest material available, control was fairly satisfactory at 1½ pounds to 50 gallons. Poorly milled material at 7 or 11 ounces to 50 gallons was very poor. Quebracho tannin-uncombined nicotine and nicotine peat were unsatisfactory, the former being so poor that beans treated with this material had to be sprayed with a rotenone-bearing root to save them. Magnesium arsenate gave good control. The use of hoods behind the power duster permitted reduction in dosage without reduction in control.

Residue properties of derris on bean leaves.--Experiments conducted at 13 Bureau laboratories from coast to coast, and coordinated by R. A. Fulton and Mr. Howard, of the Columbus laboratory, indicate that the most important factor concerned in the decrease of rotenone from sprayed bean plants was rainfall, heavy rains causing greater loss, as would be expected. The loss in toxicity was comparatively slight after 31 days where no rainfall occurred (Twin Falls, Idaho), but very rapid at Columbus, Ohio, within 4 days, owing to rainfall. Intense sunlight in the Southwest and the South did not account for as great a loss in toxicity as did rainfall, although it appears to be a factor.

Seasonal occurrence of cabbage worms at Charleston, S. C.--Studies conducted by W. J. Reid, Jr., of the Charleston, S. C., laboratory, on the seasonal occurrence of the principal species of cabbage worms on cabbage in that locality, disclosed that these species, consisting principally of the imported cabbage worm, the diamondback moth, the cabbage looper, and several species of Agrotinae (cutworms) are more abundant during the spring months than during the fall and winter; that populations of all species decreased to a marked extent during the fall, when the mean temperatures are below approximately 50° F, and do not increase greatly in the spring until the mean temperatures are consistently above 60°; that after the plants are thinned or transplanted the cutworms and the cabbage looper are the most abundant species during the fall months and the cabbage looper and the diamondback moth during the spring; and that there are about two generations of each of the major species of cabbage worms during their more active periods in both the fall and spring seasons.

Beet leafhopper conditions in southern and central Idaho.--J. R. Douglass and his associates at the Twin Falls, Idaho, laboratory, have submitted the following summarized report upon the information available at the end of February on the probable populations of the beet leafhopper during the spring and early summer in Twin Falls, Jerome, Minidoka, and Cassia Counties, south-central Idaho: (1) Precipitation above normal during April and May 1937 germinated a dense stand of Russian-thistle, the summer host plant of the beet leafhopper. Abnormally dry summer weather reduced the suitability of dense stands for leafhopper development and early fall populations were the lowest for the past four seasons, even though the equivalent acreage of

Russian-thistle was the second largest on record. (2) Fall temperatures above normal, with sufficient precipitation, permitted adequate germination (about October 24) of mustard, the leafhopper's natural fall and winter host plant. Excessive precipitation in November and December permitted a much more dense and widespread germination near the end of November. Consequently, the beet leafhopper left its holdover host with little delay and entered the winter under favorable conditions. (3) Fall surveys in the Sailor Creek sagebrush area showed the highest late-fall population in 4 years. (4) The winter was extremely mild and in general has been favorable for survival, being comparable to that of 1933-34, which was followed by a season of high leafhopper populations. Recovery from hibernation cages also indicates a high winter survival. (5) Experience has shown that an early spring advances the date of migration into the cultivated areas. It is, however, possible that if the coming spring should be cool and wet the migration into the cultivated area will be reduced and delayed. (6) Regardless of conditions, high populations may be expected in beet areas very close to leafhopper breeding grounds. (7) As spring conditions greatly affect leafhopper populations and time of migration into beet fields, a second statement, based on field studies in the spring, will be issued later.

## INSECTS AFFECTING MAN AND ANIMALS

A new variety of Anopheles crucians Wied. found in Georgia.--W. V. King, Orlando, Fla., reports: "Specimens of anopheline larvae showing peculiar variations in larval characters were collected in Georgia by R. E. Bellamy and forwarded to us for identification. In company with Mr. Bellamy, a collection of this form was made by the writer at Quitman, Ga., on February 16 and the material was brought back to the Orlando laboratory for rearing and study. The larvae proved to be a distinct variety of A. crucians and are readily distinguishable from the two other forms of this species."

Phenothiazine as a mosquito larvicide.--Mr. King also states: "A series of larvicidal tests was carried out with phenothiazine dissolved in sulphonated oil and acetone in the proportions of 1-20-5. In catch-basin tests, using a phenothiazine dilution of 1-500,000, the treatments gave mortalities (within 24 hours) of from 85 to 100 percent, with an average of 95 percent in 11 tests. At a dilution of approximately 1-1,000,000 the mortality ranged from 50 to 87 percent, with an average of 68 percent in four tests. It was evident, therefore, that a considerably higher concentration was required to destroy the larvae than that indicated by the laboratory tests, in which dilutions of 1-2,000,000 were effective with tub-reared larvae. From further laboratory tests in which larvae from the two sources were compared, both in catch-basin water and in tap water, it was found that the larvae from the catch basins gave variable results but were generally much more resistant to poisoning with this material. This is somewhat comparable with the results obtained last year with larvae reared on an artificial diet of yeast and dried blood."

Activity of screwworm flies.--D. C. Parman, of the Uvalde, Tex., laboratory, reports: "The survey traps indicate that Cochliomyia americana C. and P. was practically exterminated during the summer in the southern areas in which traps are operated, viz., at Catarina, Laredo, Hebbronville, Alice, and Three Rivers, Tex. In no catch since August 1937 has there been more than one or two flies in any of these traps, none has been taken since December, and only one fly was taken in December. From the last screwworm control reports, it is indicated that there were infestations of *C. americana* building up in Cameron and Hidalgo Counties. The trappings have indicated that weather conditions have been very favorable for build-up of *C. macellaria* F. There were 15 quarts of flies taken at Laredo in January and 87 percent were *Cochliomyia*. We have completed Laredo, Hebbronville, and Alice traps for February and they took 21, 26, and 19 quarts of flies, respectively, and approximately 90 percent were *C. macellaria*."

*Screwworm abundance*.--C. C. Deonier, Tempe, Ariz., reports: "In Arizona *C. americana* was taken at Bumble Bee and Wickenburg during the latter half of January, and at Hassayampa during the first part of February. *C. americana* was also taken at Nogales and Tempe during the latter half of February. A considerable outbreak of screwworms was indicated by examination made in the Yuma area on February 17, infestations running as high there as 20 to 30 percent. A few cases of screwworms have been reported throughout the area worked during the winter."

*Derris powder effective against cattle lice*.--R. W. Wells, Ames, Iowa, reports: "It was found that derris powder diluted by tripoli earth to 1/16 of 1 percent rotenone is inadequate to kill all the lice, but some dead lice were found. From this test, and in view of the tests performed last year, it is concluded that dilution should not be greater than 1/8 of 1 percent rotenone. Because of the small difference in cost of rotenone content, 1/4 of 1 percent is judged to be the proper dilution for general recommendation. Such a content would compensate for lack of thoroughness in application."

## FOREIGN PLANT QUARANTINES

*Mail inspections increase*.--During the last 2 years a drive has been made through the cooperation of the Postal and Customs Services for a better coverage of foreign mail for plant-quarantine examination. Coincidentally, we have been striving to bring about the use of the green-and-yellow mail tags for authorized mail shipments of foreign plant material and a corresponding decrease in the amount of unauthorized plant material forwarded to this country by mail. That these efforts are achieving results is shown by the fact that during the fiscal year which closed June 30, 1937, a total of 249,583 foreign mail packages were inspected, as compared with 107,450 packages for the year ended June 30, 1935, the last complete year prior to placing the present special emphasis on this phase of our regulatory work. These figures show that more packages are brought to our attention than was formerly the case, and the credit is due to the added interest and efforts of the plant quarantine inspectors and to the personnel of the Postal and Customs Services.

*New fungus on plum*.--On February 16 *Septobasidium prunophilum* Couch was found covering large patches of a plum branch from Japan in the furnishings of a Japanese boat at Philadelphia. This fungus grows over scale insects and does not infect the plant itself. The large patches of brown fungus with light borders are quite showy. The species is based on material collected in Japan by R. Kent Beattie. As the article in which the species is described was in galley proof when our material was received for confirmation of the determination, Mr. Couch said the name might be used in the News Letter.

*Weevil in bamboo slats.*--Two larvae, two pupae, and four adults of *Eucalandra setulosa* Gyll. were intercepted at Washington, D. C., on August 13, 1937, in bamboo slats in cases containing orchids (*Cattleya* sp.) in express from Colombia. L. L. Buchanan remarks as follows: "Formerly *Sitophilus setulosus* Gyll. So far as known this is the first record of *S. setulosa* from bamboo. Previous data (on pin labels on other specimens in National Museum) indicate that the species may be associated with banana also." A. G. Boving reports that the larvae and pupae are new to the National Museum collection.

*Entomological interceptions of interest.*--Ten living larvae of the Mexican fruit fly (*Anastrepha ludens* Loew) were intercepted at Nogales, Ariz., on May 15, 1937, in a single mango in baggage from Mexico. Forty-four living larvae of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) arrived at Mobile, Ala., on December 30, 1937, in six tangerines in ship's stores from Portugal. A living larva of the Japanese beetle (*Popillia japonica* Newm.) was taken at New York on December 10, 1937, in soil around the roots of chrysanthemum in cargo from Japan. Specimens of Cardin's whitefly (*Aleurodicus* (*metaleurodicus*) *cardini* Back) were intercepted at Miami, Fla., on December 17, 1937, on a guava leaf in passenger's baggage from Cuba. A living specimen of *Actinothrips trichaetus* Hd. was found at New Orleans on October 29, 1937, with banana debris in cargo from Nicaragua. A living specimen of the coreid *Chelinidea hunteri* Han. was taken at Nogales, Ariz., on November 24, 1937, on a cactus (*Lophocereus schottii*) stalk in cargo from Mexico. A living larva of the turnip gall weevil (*Ceutorhynchus pleurostigma* Marsh.) arrived at Philadelphia on January 13 in a turnip in ship's stores from Germany. A living specimen of the thrips *Frankliniella lilivora* Kur. was intercepted at San Francisco on December 1, 1937, on a bulb of *Lilium* sp. in the mail from Japan. A living specimen of the lygaeid *Perigenes dispositus* Dist. was found at Brownsville, Tex., on August 30, 1937, on husk tomato (*Physalis* sp.) in baggage from Mexico. A living specimen of *Bruchus chinensis* L. arrived at Honolulu, Hawaii, on February 5, 1937, with red beans in baggage from China. Three living larvae of the olethreutid *Laspeyresia splendana* Hon. were intercepted at Chicago, Ill., on November 8, 1937, with chestnuts in the mail from Italy.

*Pathological interceptions of interest.*--Our first interception of a plant disease on statice was an undetermined species of *Cercospora* on *Statice armeria* in baggage from Guatemala and taken at the Brownsville airport on February 11. *Cercosporella* sp. was found on *Laelia* sp. in a shipment of orchids from Mexico on May 20, 1937, at San Francisco. *Erysiphe umbelliferarum* De Bary was intercepted for the first time on February 7 at Philadelphia on parsnip seeds in a shipment from Holland. *Fusicladium depressum* (B. & Br.) Sacc. was found on fennel seeds in a shipment from Union of Soviet Socialist Republics on May 17 at New York. *Gloeosporium euonymicolum* Hemmi was found at Seattle on August 31, 1937 on *Euonymus* foliage from

Japan, for the first time since 1931. *Hormodendrum cladosporioides* (Fres.) Sacc. was intercepted for the first time on January 21 at New York on tomatoes from France. *Macrophoma* sp. (no species reported as occurring on the host) was intercepted at New York on an *Ismene* plant in baggage from Azores on June 4, 1937. *Phomatospora* sp. (no species described on *Camellia*) was intercepted on a shipment of camellia plants from Japan on January 6 at San Francisco. *Phyllosticta laeliae* Keissl. was intercepted on a number of plants of *Laelia* sp. in a shipment of orchids from Mexico, May 21, 1937, at San Francisco. *P. ruberum* Sacc., first interception, was found on raspberry cuttings from Switzerland on November 27, 1937, at Baltimore. *Septoria weisii* Allesch., first interception, was found on chervil (*Chaerophyllum bulborum*) from Italy on January 18 at Philadelphia. A fungus found on bark of a log of *Cryptocarya palmerstoni* from Australia on November 10, 1937, at New York has been determined doubtfully as *Sphaeronema talcahuanense* Speg., since the spores were narrower than the description calls for. *Thielavia basicola* (B. & Br.) Zopf was intercepted on sweetpotato from Japan for the first time on February 27 at Philadelphia.

## DOMESTIC PLANT QUARANTINES

*Grasshopper control work being rapidly organized.*--Field offices have been established at 707 Thorpe Building, Minneapolis, Minn., as headquarters for the grasshopper control work in 24 Western States. B. M. Gaddis and the field project leader, W. E. Dove, are contacting State committees and State leaders and organizing the campaign. The emphasis in this year's control program is on crop protection and the work will be carried on in the same manner as in previous years. Activities will be conducted on a county, township, or community basis and will include the treatment of highways and uncultivated lands. The States have been circularized as to quantities of bait material remaining on hand from last year, points of delivery for early shipments, storage facilities, mixing stations for poison bait, and mechanical spreaders available. An early survey will be made of the nymphal stage of the insect, and later of the adult and egg stages. This work will be under the supervision of R. L. Shotwell. A recent Departmental press release says: "Unless conditions unfavorable to grasshopper development intervene, heavy infestations of the pest may be expected in 24 States from Michigan to the Pacific coast and from the Canadian border to Mexico." The season in northern Texas and Oklahoma is reported to be about 2 weeks earlier than usual. With initial shipments of bait materials made early, work started early in each State, and it is anticipated that the work, if vigorously pursued, will effectively aid in preventing crop losses from grasshoppers.

*Field leader selected for Mormon cricket control.*--Claude Wakeland, on leave from Idaho, has been selected as field leader of the project on Mormon cricket control for the duration of the project. His headquarters are in the Newhouse Building, Salt Lake City, Utah. Control measures found effective in the past--the use of poison dust--will be employed and the program will emphasize crop protection, with activities placed on a county, township, or community basis, the same as for grasshopper control. The States of Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming face heavy infestations of Mormon crickets in 1938. State leaders estimate crop losses from the cricket in 1937 at approximately $898,000.

States vitally interested in new projects.--The Mormon cricket and grasshopper control activities were recently discussed with representatives of 6 Western States while attending a conference at Salt Lake City, and all showed keen interest and activitiy in setting up the local organizations and getting the work under way.

White-fringed beetle field office moved.--A field office for the white-fringed beetle control project was recently established in the Gates and Cook Building, Gulfport, Miss. Other offices are maintained at Florala, Ala., Laurel, Miss., Pensacola, Fla., and New Orleans, La., the last being in the State Department of Agriculture and Immigration, 3925 South Carrollton Avenue.

Work in white-fringed beetle areas.--Activities in February were devoted principally to contacting farmers as to cultural practices and to clean-up work in the infested towns, in order to prepare areas for trap crops or for burning or dusting. At New Orleans, where no control work has previously been done, an engineer is laying out ditch lines and a 6-man crew is cleaning up the area. A recent meeting was held in that city at which colored motion pictures of the beetle were shown and a talk on control measures was given by one of the project representatives. The meeting was attended by members of two large industrial plants in the infested area, a railway official, sheriff, State representatives, a farm agent, and others, all of whom agreed to assist in control work. In the Florala, Ala., area, contacts with farmers agreeing to leave unplanted 10-foot strips around fields and between rows and to eradicate weeds along fence rows, has been speeded up in four counties in the infested area in Florida and Alabama by the employment of additional men. Four men are working Laurel, Miss., and obtaining signed agreements of property owners to limit garden growing. This work is furthered by State officers and county agents running newspaper articles in local papers. Control work at Gulfport, Miss., carried on by five men, is facilitated by a city ordinance authorizing such activities as spraying, burning, trap-crop planting, and forbidding the public to graze cattle in the city limits. At Saucier, Miss., where an infestation of Naupactus similar to the white-fringed beetle was found last year, 15 men are clearing away underbrush, and farmers are cooperating 100 percent in the control program. The clean-up work at Pensacola, Fla., has been completed in the infested area with the assistance of city officials and is being extended to adjacent city blocks.

Public cooperating in white-fringed beetle campaign.--Citizens throughout the infested areas are showing a public-spirited attitude in the campaign against the beetle. Meetings are participated in by farmers, school principals, industrial groups, chambers of commerce, county agents, extension workers, and State officials. Project leaders, in response to requests, have exhibited motion pictures and discussed the work before meetings of entomological clubs in Mississippi and Texas.

Equipment for white-fringed beetle work.--Five spray machines of 2, 3, 5, 8, and 10-horsepower have been purchased. They are being used in spraying oil to kill vegetation on areas where eradication has been carried on and will be used later in the season for spraying arsenicals when adult beetles are feeding. Two miles of galvanized strips have been obtained for barrier purposes. Five carloads of tank trucks, trailers, flame-throwing units, tractors, plows, and other equipment, have been transferred from the Japanese beetle project at New Cumberland, Pa. A mobile shop, office furniture, a caterpillar tractor, and a shroud-burning outfit have been transferred or loaned from other projects. Machinists are reworking the equipment to meet topographic conditions. Pyroligneous acid and oil have been donated by commercial concerns for experimental purposes. Pine-tar extract is being tested as a weed killer. Maps of all farms in the infested area are being completed, showing details as to crops or other ground cover, location, and acreage.

Phony peach and peach mosaic disease control.--Officials of States infected with the phony peach disease, whose activities contributed to the marked reduction of the disease in 1937, are preparing to increase such activities in 1938. During the past season the various States assigned 31 inspectors to the phony peach project and the Bureau employed 64 inspectors. In the States infected with peach mosaic similar activities were carried on and a peach mosaic committee was formed of growers and State officials. Work carried on by an average of 179 relief employees in February in the States of Alabama, Arkansas, California, Colorado, Georgia, New Mexico, Tennessee, and Texas, effected the destruction of 97,000 abandoned and escaped peach trees, as well as trees found infected in the inspection season of 1937. Most of the large abandoned orchards in the infected area in California, for which waivers have been signed, have been removed, and waivers are continuing to be signed.

Soil Conservation Service aids peach mosaic program.--The Indian Service has been provided with 7,500 peach nursery trees by the Soil Conservation Service to replace diseased trees on Indian pueblos in New Mexico, on condition that all mosaic trees are removed from the pueblos, and word is received that agreements are now being made to remove the diseased trees. The need of familiarizing the growers in the State with the mosaic situation is being met through contacts with farmers, aided by county agents.

States make important changes in peach mosaic quarantines.--One of the principal changes in the standardized State quarantines relating to the peach mosaic disease now being revised to include new areas, is the reduction of the 5-mile sanitation zones around nurseries growing peach stock. During the 1937 inspection season thorough inspection was made of the 5-mile zones surrounding 226 nurseries and budwood sites in the 7 infected States, representing a coverage of 16,950 square miles. Observations of the disease in the several infected areas over a period of years, particularly as to spread from year to year, have led to the belief that the 5-mile inspection zone may be safely reduced to 1 mile, and several States have adopted this provision as standard in current revisions of the quarantines. To the host list is added plum, and the movement of such stock is prohibited since certain species have been found to be symptomless carriers of the disease. The quarantines, as heretofore, place restrictions on shipments from the infected area within the State issuing the quarantine, as well as upon their entry from regulated areas of other States.

Progress in sweetpotato weevil control.--An analysis of the sweetpotato weevil work shows that during the 5½ months since the project was begun to the close of the year, 97 counties have been surveyed in 5 States, in cooperation with these States. The area constitutes a belt ranging from southern Georgia through southern Alabama, central Mississippi, central Louisiana, and northeastern Texas. Thirty counties have been found to be infested. Nearly 30,000 properties were inspected, 2,500 of which were found to be infested. The work was intensive in the known infested areas, including a 5-mile radius of properties where the weevil was found, and "spotted" in the outlying areas. Eradication activities have been concentrated on the lightly infested areas. To this end sanitary measures and cultural practices have been carried out in 16 counties. Vines were removed from the fields before harvest, sweetpotatoes were culled before storage, fields were replowed, storage houses cleaned, seed tubers selected, old seedbeds destroyed and sites selected for new ones, and weevils trapped in the cleaned fields. Of the 630 acres planted in the eradication areas, 95 percent have been replowed during the winter. Disposal of tubers normally held by growers for seed the following spring, amounting in many instances to 2,000 bushels, was the greatest problem in the eradication work. At the insistence of inspectors, however, 85 percent of the sweetpotatoes stored on infested properties have been fed to livestock and those on adjacent properties have been confined to local markets for food. State inspectors experienced in the sweetpotato weevil work have greatly assisted the activities in the various States. A uniform quarantine on sweetpotato weevil infestations was drawn up at the February meeting in New Orleans of the Southern Plant Board and the quarantine is being adopted by the various infested States.

W. R. Heard in charge of citrus canker project.--Mr. Heard has been selected as field leader of citrus canker eradication activities, with headquarters at 315 Citizens State Bank Building, Houston, Tex. He has been employed in this Bureau since 1921 and has successfully conducted field activities on projects relating to the pink bollworm, tropical and subtropical insect investigations, Mexican fruit fly, and citrus canker.

Citrus canker activities.--It was necessary to close the Federal inspection work in Louisiana the last of February, following an intensive inspection with the force increased by 10 inspectors of whom 3 were employed by the State. All properties which have been found infected with citrus canker since 1935 were carefully covered, as were the 5-mile zones surrounding them. The bayous and canal levees near the water's edge were reached in a boat and inspected much better than could have been done on foot. Aerial photos were used to locate old home sites in marshes. Every property, fence row, and ditch bank was covered in such a manner that every citrus tree was found and inspected if it was humanly possible to do so. No canker was found in the State in February. The few abandoned and escaped citrus trees found were destroyed. The State of Louisiana will continue the services of two inspectors formerly on the Federal roll. Work is continued in Texas, and citrus canker was recently found on one small seedling of *Citrus trifoliata* in Hamshire, Jefferson County, in an area where 625 trees were found infected in the winter of 1935-36. Not since April 1936 had canker been found in the county.

Transit-inspection activities.--Transit inspectors report that shipping of nursery stock was showing an increase the latter part of February in the Northeast and Middle West, but that Texas citrus fruit shipments were declining. During the month of February transit inspection was carried on at 20 of the more important railway terminals throughout the United States, and 77,125 shipments moving via express, freight, and parcel post were inspected, and 152 of them were found to be moving in violation of Federal quarantines.

## DIVISION OF CONTROL INVESTIGATIONS

Electric soil-heating cables for controlling temperature in insect-rearing cages.--F. H. Babers, of the Beltsville, Md., laboratory, has found electric soil-heating cables with thermostatic control satisfactory as a method of controlling temperature in cages used in rearing southern armyworms. Thirty-foot lengths of cable are buried in loose sand in the bottom of each cage. These cages, designed by P. A. Woke, are approximately 39 by 27 by 16 inches, with glass sides and a fine-mesh metal-cloth top. With the outside temperature between 50° and 55° F., the cage temperatures were maintained at 80° ± 5°.

Effect of diet on resistance of mosquito larvae.--An interesting study has just been made of the effect of 13 diets on the resistance of mosquito larvae to nicotine, rotenone, and phenothiazine. A. M. Phillips, of the Sanford, Fla., laboratory, reports that by feeding various diets to different groups of larvae it was possible to cause a variation of 75 percent in the mortality of fourth-instar larvae resulting from nicotine and rotenone. The variation in the results from phenothiazine was not as great, because the concentration used was high enough to cause complete mortality in most cases. In general, the better diets caused a more rapid rate of growth and resulted in more resistant larvae. It was noted, however, that the diets did not have the same effect with all three insecticides or, in other words, the larvae most resistant to rotenone were not the most resistant to nicotine or phenothiazine.

## IDENTIFICATION AND CLASSIFICATION OF INSECTS

An important rice pest identified.--Moths reared from rice and submitted by Belisario Losada, chief of the department of economic entomology of Colombia, were identified by Carl Heinrich as Rupela albinella (Cramer). This species belongs to an American genus of white moths, all similar in appearance and identifiable only by their genitalia. Until recently they could not be named with any certainty. R. albinella is distributed throughout Central and South America and appears to be the major pest of rice in the American tropics. Dr. Losada states that in the department of Valle, Colombia, it has caused serious damage to the crop. Specimens of an egg parasite of this lepidopteron, which accompanied the moths, have been determined by C. F. W. Muesebeck, after preliminary examination, as apparently identical with *Telenomus* (*Phanurus*) *rowani* Gah., which has previously been known only from the Philippine Islands and Formosa, where it parasitizes the eggs of another rice pest, *Schenobius incertellus* Walk.

*Changes in the scientific names of two sawflies.*--In the Bureau News Letter for February 1937 (vol. IV, no. 4) a distribution record was given for a spruce sawfly under the name of *Pachynematus alaskensis* Rohwer. This species has recently been transferred to another genus and should now be called *Pikonema alaskensis* (Rohwer). It has also been taken in New Brunswick and Quebec, as well as other localities between these and British Columbia, on *Picea engelmanni*, *P. canadensis*, and *P. mariana*. *Pachynematus ocreatus* (Harrington), the references to which usually apply to *P. alaskensis*, is no longer valid, as it is a synonym of *Pikonema dimmockii* (Cresson). The purslane sawfly, which has usually been known under the name *Schizocerus zabriskei* Webster and Malley, should, as a result of the synonymizing of the genus *Schizocerus* with *Sterictiphora*, be called *Sterictiphora* (*Leston*) *zabriskiei* (Webster and Malley), the subgenus *Leston* having been recently proposed for this species.

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